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ABSTRACT

This booklet, developed by the Oregon Vo-Tech Math Project, contains a broad range of mathematical problems used related to vocations in the area of marketing. Solutions to all problems are included. Problems included involve whole numbers, fractions, decimals, measurement, solution of equations, logarithms, and percent. (SD)

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# ILS INDIVIDUALIZED LEARNING SYSTEMS

**Individualized Math Problems in**

# Marketing

**Oregon Vo-Tech Mathematics Problem Sets**

Retrieval - Dissemination Center
Oregon Board of Education
942 Lancaster Drive N.E.
Salem, Oregon 97310
Phone: 378-3566

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Individualized Learning Systems

# MATHEMATICS

Marketing

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A. Problems with Solutions

1.

Weekly Sales Report

| Dept | Mon | Tue | Wed | Thu | Fri | Sat | Total |
|---|---|---|---|---|---|---|---|
| X | 254 | 198 | 300 | 273 | 251 | 321 | |
| Y | 197 | 143 | 201 | 184 | 225 | 251 | |
| Z | 83 | 72 | 179 | 125 | 96 | 156 | |
| Totals | | | | | | | |

Fill in the blanks in this report and check your answers.

Solution:

Add the numbers across.

Dept X = 254 + 198 + 300 + 273 + 251 + 321 = 1,597

Dept Y = 197 + 143 + 201 + 184 + 225 + 251 = 1,201

Dept Z = 83 + 72 + 179 + 125 + 96 + 156 = 711

Add the numbers down.

| Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|
| 254 | 198 | 300 | 273 | 251 | 321 |
| 197 | 143 | 201 | 184 | 225 | 251 |
| + 83 | + 72 | + 179 | + 125 | + 96 | + 156 |
| 534 | 413 | 680 | 582 | 572 | 728 |

As a check, the sum of the sums across should equal the sum of the sums down.

1,597
1,201
+ 711
3,509

534 + 413 + 680 + 582 + 572 + 728 = 3,509

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A. Problems with Solutions (continued)

2. A merchant in one year had sales of $25,608. The inventory of the goods on hand at the beginning of the year was $5,682; and at the end of the year was $3,169. He purchased merchandise during the year at a cost of $12,468. If his selling expenses for the year were $6,829 and in addition he spent $1,026 for advertising, did he gain or lose and how much?

Solution:

Amount gained = Sales - Expenses

To get total expenses, we will treat the drop in inventory as an expense.

Total expenses = ($5,682 - $3,169) + $12,468 + $6,829 + $1,026
= $22,836

Amount gained = $25,608 - $22,836 = $2,772

3. An appliance manufacturer sold 56,583 refrigerators during the first quarter (3 months) of the year. Second quarter sales were 65,325 units. What was the average sales per month for the first half of the year?

Solution:

We need to find the total number of units sold and divide by 6.

Total sold = 56,583 refrigerators + 65,325 refrigerators
= 121,908 refrigerators

$$\text{Average} = \frac{121{,}908 \text{ refrigerators}}{6 \text{ months}} = 20{,}318 \text{ refrigerators/month}$$

4. Irwin Miller is the owner of Miller's Paint Store. His inventory on October 1 showed a stock of merchandise amounting to $11,984. His purchases in October amounted to $2,842; and his sales totaled $4,173. His inventory on October 31 was $12,189.

a) Find the cost of the goods sold during the month.

b) Find the gross profit for the month.

Solution:

(a) Cost of goods sold = total cost of goods handled - cost of goods left
= ($11,984 + $2,842) - $12,189
= $14,826 - $12,189
= $2,637

A. Problems with Solutions (continued)

4. Solution: (continued)

(b) Gross profit = Sales - Cost of goods sold

= $4,173 - $2,637

= $1,536

B. Problems without Solutions

5. A retail furniture dealer buys a studio couch for $125. At what price should he sell it if he desires a gross profit of $95?

6. The packing department of Ajax Industry is required to keep records of the shipping weight, net weight and packing weight of all items shipped. The following form must be completed and turned into the records department.

| | Shipping Weight | Net Weight | Difference |
|---|---|---|---|
| Item A | 1,500 lbs | 1,343 lbs | |
| Item B | 2,800 lbs | 2,551 lbs | |
| Item C | 675 lbs | 619 lbs | |
| Total | | | |

Complete this table and check your totals.

7. Sales for the Rockwell Mfg Company amounted to $376,000 last year. During the first 6 months of last year the monthly sales were $37,000; $15,000; $26,500; $37,500; $28,750 and $32,500, respectively. How much were the sales for the remainder of the year?

B. Problems without Solutions (continued)

8. Evans Company had 10,700 gear parts in stock. During January, 8,978 were sold. How many should be left in stock?

9. Last year, the sales of E.I. Hicks were $31,482. His inventory at the beginning of the year was $10,344. His purchases during the year amounted to $21,246. His inventory at the end of the year was $9,868.

   (a) Find the cost of the goods sold during the year.

   (b) Find the gross profit for the year.

10. Johnson Company began the year with an inventory valued at $41,049. During the year they purchased additional goods for $356,285. At the end of the year the remaining inventory was worth $57,372. What was the value of the goods which were sold?

B. Problems without Solutions (continued)

11. A stationer's merchandise inventory was $16,843 on October 1 and $17,355 on December 31. Sales for the quarter were $21,466, and the purchases were $13,927. Find the gross profit for the quarter. (1 quarter = 3 months.)

12. A millinery dealer bought 20 dozen ladies' hats for $900. He sold 100 hats at $6.00, 80 hats at $5.00 and the rest at $4.00. Find the total amount of his gross profit.

Complete Solutions to B Problems

5. Selling Price = Cost + Profit

Selling Price = $125 + $95 = $220

6. Item A: 1,500 lbs - 1,343 lbs = 157 lbs

Item B: = 2,800 lbs - 2,551 lbs = 249 lbs

Item C: 675 lbs - 619 lbs = 56 lbs
Sum of differences 462 lbs

Check this by adding shipping weights:

1,500 lbs + 2,800 lbs + 675 lbs = 4,975 lbs

Then subtract total net weights:

1,343 lbs + 2,551 lbs + 619 lbs = 4,513 lbs

Difference: = 4,975 lbs - 4,513 lbs = 462 lbs

7. Sales for last 6 months = year's sales - first 6 months sales

You need to add monthly sales for first 6 months:

$37,000
15,000
26,500
37,500
28,750
+ 32,500
$177,250

Thus,

Sales for last 6 months = $376,000 - $177,250
= $198,750

8. Ending Inventory = Beginning inventory - Number sold

= 10,700 gear parts - 8,978 gear parts

= 1,722 gear parts

Complete Solutions to B Problems (continued)

9. Cost of goods sold = Cost of goods available for sale - End Inventory

But,

Cost of goods available for sale = Beginning inventory + Purchases

Cost of goods available = $10,344 + $21,246 = $31,590

Cost of goods sold = $31,590 - $9,868 = $21,722

10. Cost of goods sold = Cost of goods available - Ending inventory

But,

Cost of goods available = Beginning inventory + Purchases

= $41,049 + $356,285 = $397,334

Cost of goods sold = $397,334 - $57,372 = $339,962

11. Gross profit = Sales - Cost of goods sold

Cost of goods sold = Cost of goods available - Ending inventory

= ($16,843 + $13,927) - $17,355

= $30,770 - $17,355 = $13,415

Gross profit = $21,466 - $13,415

= $8,051

12. Gross profit = Sales - Cost of goods sold

Compute total sales:

Sales = (100 hats)($6/hat) + (80 hats)($5/hat) + (240 hats - 180 hats) ($4/hat)

= $600 + $400 + (60 hats)($4/hat)
= $600 + $400 + $240
= $1,240

Gross profit = $1,240 - $900 = $340

A. Problems with Solutions

1. Compute and check the net change during the month of February of your stock positions, assuming they are as follows:

| | Price, Jan 31 | Price, Feb 28 | Change |
|---|---|---|---|
| UNITED ELECTRIC | 62 5/8 | 68 3/4 | _____ |
| GENERAL OIL | 22 | 25 3/8 | _____ |
| TOTALS | _____ | _____ | _____ |

(NOTE: By filling in the blanks above, you will be solving the problem as stated.)

Solution:

United Electric change = 68 3/4 - 62 5/8

= 68 6/8 - 62 5/8 = 6 1/8

General Oil change = 25 3/8 - 22 = 3 3/8

Total change = 6 1/8 + 3 3/8 = 9 4/8 = 9 1/2

To check:

Total change = sum of Feb 28 prices - sum of Jan 31 prices

= (68 3/4 + 25 3/8) - (62 5/8 + 22)
= (68 6/8 + 25 3/8) - 84 5/8
= 93 9/8 + 84 5/8
= 9 4/8 = 9 1/2

2. By selling eggs at 45¢ a dozen, you make a profit of 2/3¢ per egg. How much profit would you make per egg by selling them at 48¢ per dozen?

Solution:

Selling proce per egg at 45¢ per dozen = $\frac{\$0.45/\text{doz}}{12\ \text{eggs/doz}}$

= 3 2/3¢ per egg

Selling price per egg at 48¢ per dozen = $\frac{\$0.48/\text{doz}}{12\ \text{eggs/doz}}$

= 4¢ per egg

A. Problems with Solutions (continued)

2. Solution: (continued)

Profit increase per egg = 4¢ - 3 2/3¢

= 12/3¢ - 11/3¢ = 1/3¢

Total profit per egg at 48¢ per dozen = 2/3¢ + 1/3¢ = 1¢

3. An inventory count in the yardage department of a retail store indicated that there were 6 rolls of #216 gingham containing 16 1/8, 27 4/8, 36 2/8, 45 3/8, 50 7/8 and 42 3/8 yards, respectively. At $2 a yard, what was this stock worth?

Solution:

16 1/8 yards
27 4/8 yards
36 2/8 yards
45 3/8 yards
50 7/8 yards
42 3/8 yards
+

Total 216 20/8 yards = 218 1/2 yards

Total worth = (218 1/2 yds)($2/yd)

= (437/2 yds)($2/yd) = $437

4. Mr. Brown owned 3/7 of a store. He sold 1/3 of his share for $13,000. At the same rate, what was the value of the store?

Solution:

He sold 1/3 of 3/7 = (1/3)(3/7) = 1/7

x = value of the store

(1/7)x = $13,000

x = ($13,000)(7)

x = $91,000

B. Problems without Solutions

5. A company packs its cat food in cans containing 13 1/2 oz of cat food. Each can weighs 1 3/4 oz. Two dozen cans are packed in a carton weighing 12 oz. What is the shipping weight of one carton?

6. A merchant typically sells 1,000 baseball bats per month at $4 each. He decides to increase the price per bat by 1/4, and this in turn decreases his total sales volume by 1/5. Will he make more, less, or the same amount of profit at the new price? (Assume that his expenses remain constant.)

7. Tom, Dick and Harry make a profit of $3,600 in a joint investment venture. Tom gets 1/2, Dick gets 1/3 and Harry gets 1/6 of the total profit. How much does each man get?

B. Problems without Solutions (continued)

8. Unroasted coffee costs $0.72 per pound, and shrinks to 4/5 of its original weight when roasted. How much will it cost to buy enough unroasted coffee for 10 lb of roasted coffee?

9. Four men - Brown, Cole, May and Ward - each owns 1/4 of a business. Brown sells 1/3 of his share to Cole and the rest to May. What part does each of the three remaining partners now own?

10. A grocer bought 255 3/4 pounds of bacon which he divided into 1/2 pound packages. How many packages did he have for sale?

B. Problems without Solutions (continued)

11. If it required 16 weeks at 40 hours per week for 22 men to complete a job, how many weeks would it take them to complete the same job working 56 hours if they accomplish (a) the same amount per hour, (b) only 9/10 as much per hour when working longer hours?

12. A man worked the following number of hours each day during a 5 day week: 6 1/2 hours, 7 3/4 hours, 8 1/2 hours, 9 1/4 hours and 7 2/3 hours, respectively. How many hours did he work and how much did he earn if he was paid at the rate of $6 an hour?

B. Problems without Solutions (continued)

13. Mr. Bradshaw bought 200 used tires for $175 at an auction. He sold 1/4 of them for $60.00; 16 tires at $7.50 each; 51 tires at $10.00 each and junked the rest. How many tires did he throw away? What was his total profit if the cost of handling this transaction amounted to $65.00?

14. A businesswoman invested $1,533 to buy shares of a stock that cost 27 3/8 dollars per share. How many shares did she buy?

15. Three and five-eighths yards of fabric are required to manufacture a certain type of jacket. How many jackets can be made from 4,350 yards of fabric?

B. Problems without Solutions (continued)

16. Mr. Eaton, Mr. Hayes, and Mr. Huff owned a business jointly and shared profits and losses in proportion to their investments which were $25,000, $15,000, and $30,000 respectively. What fractional part did each man own in the business? If profits amounted to $2,688 for the current year, how much did each man receive as his share?

Complete Solutions to B Problems

5. Total weight of cat food = (13 1/2 oz/can)(24 cans)

= (27/2 oz/can)(24 cans) = 324 oz

Total weight of cans = (1 3/4 oz/can)(24 cans)

= (7/4 oz/can)(24 cans) = 42 oz

Shipping weight = 324 oz + 42 oz + 12 oz = 378 oz

Since there are 16 oz in one lb, the shipping weight of one carton is 23 lbs 10 oz.

6. At first glance, there might be a temptation to compare the two fractions 1/4 and 1/5, and conclude that the merchant makes more profit since 1/4 is larger than 1/5. Let's look more closely.

Compare the total sales before and after the price increase:

Sales before increase = (old volume)(old price)

= (1,000 bats)($4/bat) = $4,000

Sales after increase = (new volume)(new price)

= [1,000 bats - (1/5)(1,000 bats)] [$4+(1/4)($4)]

= (1,000 bats - 200 bats)($4 + $1)

= (800 bats)($5) = $4,000

Conclusion: Profit after increase is same as profit before

7. Tom's portion = (1/2)($3,600) = $1,800

Dick's portion = (1/3)($3,600) = $1,200

Harry's portion = (1/6)($3,600) = $600

Complete Solutions to B Problems (continued)

8. First, find how many lbs of unroasted coffee is needed to make 10 lbs of roasted:

c = lbs of unroasted coffee

(4/5)c = 10 lbs

c = (10 lbs)(5/4)

c = 50/4 lbs = 25/2 lbs

Total cost = (lbs of unroasted coffee)(cost per lb)

= (25/2 lbs)($0.72/lb) = $9.00

9. Ward still owns 1/4 of the business

Cole's share = 1/4 + (1/3)(Brown's share)

= 1/4 + (1/3)(1/4)

= 1/4 + 1/12 = 3/12 + 1/12 = 4/12 = 1/3

May's share = 1/4 + (2/3)(Brown's share)

= 1/4 + (2/3)(1/4)

= 1/4 + 2/12 = 3/12 + 2/12 = 5/12

10. Number of packages = $\frac{\text{total pounds}}{\text{pounds per package}}$

$= \frac{255\ 3/4\ \text{lbs}}{1/2\ \text{lb/package}}$

$= \left(\frac{1023}{4}\ \text{Package}\right)(2) = 511\ 1/2\ \text{packages}$

The grocer is able to prepare 511 half pound packages of bacon for sale.

Complete Solutions to B Problems (continued)

11. The number of men working is not really important, assuming that each does an equal share of the job. So, calculate the answer using what one man does in 16 weeks at 40 hours per week.

(a) Total hours worked = (16 ~~weeks~~)(40 hrs/~~week~~) = 640 hrs

Weeks needed working 56 hrs = $\frac{640 \text{ ~~hrs~~}}{56 \text{ ~~hrs~~/week}}$ = 11 3/7 weeks

(b) For this part, only 9/10 of the job is done after 11 3/7 weeks. So, 11 3/7 weeks is 9/10 of the total number of weeks:

11 3/7 weeks = (9/10)W

W = (80/7 weeks)(10/9)

W = $\frac{800}{63}$ weeks

W = 12 44/63 weeks

12. Hours worked = 6 1/2 hrs + 7 3/4 hrs + 8 1/2 hrs + 9 1/4 hrs + 7 2/3 hrs

= 6 6/12 hrs + 7 9/12 hrs + 8 6/12 hrs + 9 3/12 hrs + 7 8/12 hrs

= 37 32/12 hrs = 39 8/12 hrs = 39 2/3 hrs

Earnings = (39 2/3 hrs)($6/hr)

= (119/3 ~~hrs~~)($6/~~hr~~)

= $238

13. Tires thrown away = 200 tires - tires sold

= 200 tires - [(1/4)(200 tires) + 16 tires + 51 tires]

= 200 tires - (50 tires + 16 tires + 51 tires)

= 200 tires - 117 tires

= 83 tires

Complete Solutions to B Problems (continued)

13. (continued)

Profit = total income - expenses

$$= \left[\$60 + (16 \text{ tires})(\$7.50/\text{tire}) + (51 \text{ tires})(\$10/\text{tire})\right] - (\$175 + \$65)$$

$$= (\$60 + \$120 + \$510) - \$240$$

$$= \$690 - \$240$$

$$= \$450$$

14. $$\text{Share bought} = \frac{\text{investment}}{\text{price per share}}$$

$$= \frac{\$1,533}{\$27\ 3/8 \text{ share}}$$

$$= (1,533)\left(\frac{8}{219} \text{ shares}\right)$$

$$= 56 \text{ shares}$$

15. $$\text{Number of jackets} = \frac{\text{total yardage}}{\text{yards per jacket}} = \frac{4,350 \text{ yds}}{3\ 5/8 \text{ yds/jacket}}$$

$$= (4,350)(8/29 \text{ jacket})$$

$$= 1,200 \text{ jackets}$$

16. Total amount invested = \$25,000 + \$15,000 + \$30,000 = \$70,000

$$\text{Eaton owns} = \frac{\$25,000}{\$70,000} = \frac{5}{14}$$

$$\text{Hayes owns} = \frac{\$15,000}{\$70,000} = \frac{3}{14}$$

$$\text{Huff owns} = \frac{\$30,000}{\$70,000} = \frac{3}{7}$$

Eaton's profit = (5/14)(\$2,688) = \$960

Hayes' profit = (3/14)(\$2,688) = \$576

Huff's profit = (3/7)(\$2,688) = \$1,152

A. Problems with Solutions

1. Chet's Chicken Inn sells chicken dinners at $1.95 per serving. If there is $421.20 in the register at the end of the day, how many dinners were served that day? (Assume that all income is from chicken dinners.)

Solution:

$$\frac{\$421.20}{\$1.95/\text{dinner}} = \frac{(\$421.20)(\text{dinner})}{\$1.95} = 216 \text{ dinners}$$

2. Compute the total value of the following stocks:

10 shares of Wolf Oil @ 16 3/8 _____

100 shares of 3rd Nat Bank @ 52 3/8 _____

150 shares of United Auto @ 12 1/8 _____

Total _____

Solution:

Shares of stock are priced in dollars and eighths of dollars. For example: 12 1/8 means $12.125.

(10 shares)($16.375/share) = $163.75

(100 shares)($52.375/share) = $5,237.50

(150 shares)($12.125/share) = $1,818.75

Total = $163.75 + $5,237.50 + $1,818.75 = $7,220.00

3. An article that cost $13.25 was sold for $18.50. What decimal part of the selling price was the profit?

Solution:

First find the amount of profit:

Profit = $18.50 - $13.25 = $5.25

To get the decimal part of the selling price:

$\frac{\$5.25}{\$18.50}$ = 0.28, correct to two decimals

A. Problems with Solutions /(continued)

4. After being damaged by fire, goods valued before the fire at $1,800 were sold at a reduction of 0.25. What was the selling price?

Solution:

Selling price = price before fire - reduction

= $1,800 - ($1,800)(0.25)

= $1,800 - $450 = $1,350

B. Problems without Solutions

5. The cost of manufacturing 4,500 pegs was $3.06. What was the cost (a) per peg, (b) for 1,000 pegs (c) what would the selling price be for 10,000 pegs if 1/3 of the selling price is profit?

6. A grocery dealer bought potatoes at various times during the year as follows: 35 bushels at $0.95 per bushel, 50 bushels at $0.83 per bushel, 25 bushels at $1.15 per bushel and 65 bushels at $0.70 per bushel. Find the average cost per bushel for all the potatoes bought.

B. Problems without Solutions (continued)

7. The F. E. Davis Company purchased 2,500 ft of wire at a cost of $0.1575 per foot and 5 boxes of bolts at a cost of $1.625 per box. Compute the total purchase cost and round the answer to the nearest cent.

8. Find the cost of sending the following shipment of boxes by freight when the rate between the two cities is 82.14¢ per hundred-weight. The boxes weigh as follows: 216 lbs, 429 lbs, 176 lbs, and 314 lbs.

9. In a 50" wide fabric it takes 11 yards to cover a couch and 6 yards to cover a chair. An upholsterer has a contract to cover 15 suites of furniture, each consisting of a couch and two chairs. How many 46-yard rolls of material must he buy?

B. Problems without Solutions (continued)

10. A merchant buys beans at $16 per hundred pounds and sells them in 4-lb sacks at 95¢ per sack. What is his profit (a) per pound, and (b) per hundred pounds?

11. Ten thousand copies of a 416 page book are to be printed on paper which weighs 120 lb per ream (500 sheets) and costs 16¢ per lb. Making no allowance for waste, find the cost of the paper needed for printing if 32 book-size pages can be obtained from <u>each side</u> of the 36 x 48 inch sheets.

12. A customer bought 2 7/8 yds of satin priced at $2.75 per yard and 5 1/4 yds of muslin at $1.80 per yard. What should the customer be charged?

E. Problems without Solutions (continued)

13. The Analy Market has 3 cash registers. Sales for each on a particular day during a typical hour were as follows: Register No. 1: $3.04, $0.79, $15.67, $32.50, $1.00, $22.66, $19.65, $0.91, and $10.16; Register No. 2: $37.89, $11.99, $5.60, $11.27, $41.20, $8.86, and $10.01; Register No. 3: $20.06, $52.00, $17.89, $5.89, $6.03, $14.56, $27.16, and $30.09. Find the total sales for each register and the total sales for all three registers.

14. Joe Smith earns $3.80 an hour. His company pays time and one-half for hours in excess of 8 per day and/or 40 hours per week. Sunday hours are paid at double time. Last week Joe worked the following hours: Monday, 8; Tuesday, 9; Wednesday, 8; Thursday, 10 1/2; Friday, 8; Saturday, 3; Sunday, 4. How much did he earn before deductions?

15. An article sold for $37.50 yielding a profit of 0.25 of the cost. What is the cost?

Complete Solutions to B Problems

5. (a) Cost per peg = $\frac{\text{total cost}}{\text{total pegs}}$

$= \frac{\$3.06}{4{,}500 \text{ pegs}} = \$0.00068/\text{peg}$

(b) Cost of 1,000 pegs = (\$0.00068/peg)(1,000 pegs) = \$0.68

(c) Selling price = cost + profit

Cost of 10,000 pegs = (\$0.00068/peg)(10,000 pegs) = \$6.80

Since the profit is 1/3 of the selling price, then the cost must be 2/3 of the selling price.

(2/3)(selling price) = \$6.80

Selling price = (\$6.80)(3/2) = \$10.20

6. Total cost = (35 bu)(\$0.95/bu) + (50 bu)(\$0.83/bu) + (25 bu)(\$1.15/bu) + (65 bu)(\$0.70/bu)

= \$33.25 + \$41.50 + \$28.75 + \$45.50 = \$149.00

Total bushels = 35 bu + 50 bu + 25 bu + 65 bu = 175 bu

Average cost = $\frac{\$149.00}{175 \text{ bu}}$ = \$0.85/bu

7. Cost of wire = (2,500 ft)(\$0.1575/ft) = \$393.75

Cost of bolts = (5 boxes)(\$1.625/box) = \$8.125

Total purchase cost = \$393.75 + \$8.125 = \$401.875

= \$401.88 when rounded to nearest cent

8. Total weight = 216 lbs + 429 lbs + 176 lbs + 314 lbs = 1,135 lbs

Expressed in hundreds of lbs $\frac{1{,}135 \text{ lbs}}{100}$ = 11.35 hundred lbs

Shipping cost = (11.35 ~~hundred lbs~~)(\$0.8214/~~hundred lbs~~)

= \$9.32

Complete Solutions to B Problems (continued)

9. Number of couches to cover = 15

Number of chairs to cover = 30

Total yardage required = (15 couches)(11 yds/couch) + (30 chairs)(6 yds/chair)

= 165 yds + 180 yds = 345 yds

Rolls needed = $\frac{345 \text{ yds}}{46 \text{ yds/roll}}$ = 7.5 rolls

He must buy 8 rolls of material

10. (a) Profit per lb = selling price per lb - cost per lb

Selling price per lb = $\frac{\$0.95}{4 \text{ lbs}}$ = \$0.2375/lb

Cost per lb = $\frac{\$16.00}{100 \text{ lbs}}$ = \$0.16/lb

Profit per lb = \$0.2375/lb - \$0.16/lb = \$0.0775/lb

(b) Profit per 100 lbs = (100 lbs)(profit per lb)

= (100 lbs)(\$0.0775/lb) = \$7.75

11. Total book-size pages to be printed = (10,000 copies)(416 pages/copy)

= 4,160,000 pages

Total "big" sheets needed = $\frac{4{,}160{,}000 \text{ pages}}{(32 \text{ pages/side})(2 \text{ sides/sheet})}$

= 65,000 sheets

Total reams needed = $\frac{65{,}000 \text{ sheets}}{500 \text{ sheets/ream}}$ = 130 reams

Total weight = (130 reams)(120 lbs/ream) = 15,600 lbs

Cost = (15,600 lbs)(\$0.16/lb) = \$2,496

Complete Solutions to B Problems (continued)

12. Total customer charge = cost of satin + cost of muslin
= (2 7/8 yds)($2.75/yd) + (5 1/4 yds)($1.80/yd)
= (2.875 yds)($2.75/yd) + (5.25 yds)($1.80/yd)
= $7.91 + $9.45 = $17.36

13. Add the entries from each register:

| Register No. 1 | Register No. 2 | Register No. 3 |
|---|---|---|
| $ 3.04 | $ 37.89 | $ 20.06 |
| .79 | 41.20 | 52.00 |
| 15.67 | 11.99 | 17.89 |
| 32.50 | 5.60 | 5.89 |
| 1.00 | 11.27 | 6.03 |
| 22.66 | 8.86 | 14.56 |
| 19.65 | + 10.01 | 27.16 |
| 10.16 | $126.82 | + 30.09 |
| + .91 | | $173.68 |
| $106.38 | | |

Total sales = $106.38 + $126.82 + $173.68 = $406.88

14. Total time worked monday thru Saturday:

8 hrs + 9 hrs + 8 hrs + 10.5 hrs + 8 hrs + 3 hrs = 46.5 hrs

Total pay = (40 hrs)($3.80/hr) + (6.5 hrs)($3.80/hr)(1.5) +
(4 hrs)($3.80/hr)(2)
= $152.00 + $37.05 + $30.40
= $219.45

15. Selling price = cost + profit

$37.50 = cost + (0.25)(cost)
$37.50 = (1.25)(cost)

$$\frac{\$37.50}{1.25} = \text{cost}$$

$30.00 = cost

A. Problems with Solutions

1. A broker sold a lot 60 feet wide and 90 feet deep, at a price of 10 cents per square foot. What price was the buyer charged?

   Solution:

   Area = (length)(width)

   = (60 ft)(90 ft) = 5,400 sq ft

   Price = (5,400 ~~sq ft~~)($0.10/~~sq ft~~) = $540.00

2. A warehouse measures 150 ft by 200 ft and rents for $9,550 per year. What is the cost of a square foot of storage for a year?

   Solution:

   Find the total square footage and divide into the total yearly rent cost.

   Area = (150 ft)(200 ft) = 30,000 sq ft

   Cost per sq ft = $\frac{\$9,550/\text{year}}{30,000 \text{ sq ft}}$ = $0.318 or about $0.32 a year for a sq ft

3. The Travel Inn Motel must recarpet eight of its units. Each unit measures 14 1/4 ft by 18 1/2 ft. The carpet selected costs $8.80 a square yard installed. How much will the job cost?

   Solution:

   Find the total number of square feet in the 8 units and then convert to square yards.

   Area per unit = (14.25 ft)(18.5 ft) = 263.625 sq ft

   Total area = (263.625 sq ft/~~unit~~)(8 ~~units~~) = 2,109 sq ft

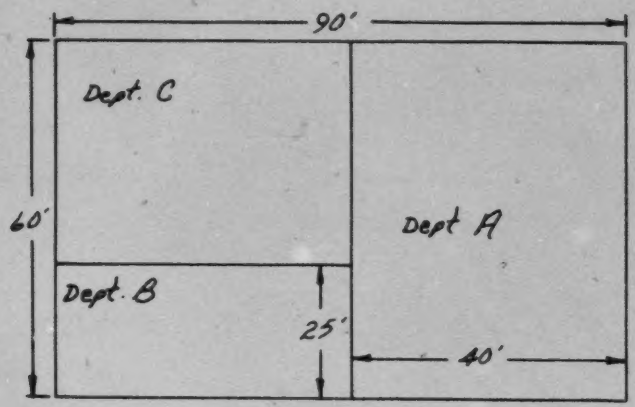
   1 sq yd = 9 sq ft, so

   2,109 sq ft = $\frac{2,109 \text{ ~~sq ft~~}}{9 \text{ ~~sq ft~~/sq yd}}$ = 234.333 sq yd

   Total cost = (234.333 ~~sq yd~~)($8.80/~~sq yd~~) = $2062.13

A. Problems with Solutions (continued)

4. Refer to the store floor plan below. If the total annual store rent is $12,000, find the annual rent to be charged each department. (i.e., fill in the blanks in the table below.)




| | Sq Ft Occupied | % of Space Occupied | Annual Rent Charges |
|---|---|---|---|
| Dept A | | | |
| Dept B | | | |
| Dept C | | | |
| TOTAL | | | |

Solution:

| | Dept A | Dept B |
|---|---|---|
| Sq ft | (40 ft)(60 ft) = 2,400 sq ft | (25 ft)(50 ft) = 1,250 sq ft |
| Percent | $\frac{2{,}400 \text{ sq ft}}{5{,}400 \text{ sq ft}}$ = 44.44% | $\frac{1{,}250 \text{ sq ft}}{5{,}400 \text{ sq ft}}$ = 23.15% |
| Rent | (0.4444)($12,000) = $5,332.80 | (0.2315)($12,000) = $2,778.00 |

| | Dept C |
|---|---|
| Sq ft | (35 ft)(50 ft) = 1,750 sq ft |
| Percent | $\frac{1{,}750 \text{ sq ft}}{5{,}400 \text{ sq ft}}$ = 32.41% |
| Rent | (0.3241)($12,000) = $3,889.20 |

Total sq ft = 2,400 sq ft + 1,250 sq ft + 1,750 sq ft = 5,400 sq ft
Total percent = 44.44% + 23.15% + 32.41% = 100.00%
Total rent = $5,332.80 + $2778.00 + $3,889.20 = $12,000.00

Level 1

B. Problems without Solutions

5. Mr. Carr decided to sell 45 acres of land by sub-dividing it into 1/3 acre lots. Five acres had to be set aside for roads and right-of-ways. How many lots will he be able to sell?

Level 2

6. A service station owner is installing new equipment. He has replaced an underground cylindrical gas tank with a new one having outside dimensions of 8 ft 9 inches in diameter and 15 ft 6 in long. If his old tank held 5,000 gallons, how many more gallons will his new tank hold? (1 cu ft = 7.5 gallons.)

7. A real estate broker sold a lot with 66 ft 9 in frontage on the street and 150 ft depth to the alley. The sale price is 16¢ per sq ft. If the broker's commission is 6%, how much did he make?

B. Problems without Solutions (continued)

8. A tract of land measures 264 ft wide by 660 ft deep. How much will the tract cost at $800 per acre? (1 acre = 43,560 sq ft)

9. (a) The Crowley Construction Company was awarded a contract to build 1.18 miles of highway. How many feet is that? (to the nearest foot)

   (b) The highway is 40 feet wide. The price for the work, including fill, leveling, grading, ballasting, subsurfacing, paving, etc., amounts to $2.25 per square foot. How much is the Crowley Construction Company getting for the job?

10. A factory site in the shape of a rectangle is 250 ft long and 231 ft 6 in wide. If it is to be fenced, (a) how many rods of fencing will be required? If the wire costs $2.25 per linear rod and only whole rods may be purchased, (b) what will be the cost of the wire? (1 rod = 16.5 ft)

B. Problems without Solutions (continued)

11. A street 960 ft long and 40 ft wide is to be paved with concrete to a depth of 6 in. (a) How many cubic yards of concrete will be used? (b) What will it cost at $15.50 per cu yd? (Assume a fraction of a cubic yard to cost the same as an entire cubic yard.)

12. A realty investment club purchased a 6 1/2 acre commercially zoned piece of property for 35¢ per square foot. How many acres of the property must the club sell at $1.00 per square foot to get back their original investment?

13. The lot is a triangular parcel with the length of the longest side 100 feet and the depth from its deepest point to the base or longest side is 40 feet. If the price per square foot is 12 cents, what price would be charged?

B. Problems without Solutions (continued)

14. The tax on a piece of property which measured 213 x 250 feet was $51.31. What are the taxes on a 17 by 250 foot strip at the same rate?

15. A company packed its fish in cans containing 12 ounces net weight. Each can weighed one ounce. Two dozen cans were packed in a carton which weighed 8 ounces. A customer ordered 64 dozen cans. What was the total weight of his shipment? (in pounds)

Complete Solutions to B Problems

5. Acres to be divided into lots = 45 acres - 5 acres = 40 acres

$$\text{Lots to sell} = \frac{40 \text{ acres}}{1/3 \text{ acre/lot}} = (40)(3 \text{ lots}) = 120 \text{ lots}$$

6. Need to find the volume in cubic feet of the new tank, then, find how many gallons it holds and compare the volume of the new tank with the volume of the old tank.

$\text{Volume} = \pi r^2 h \quad (\pi = 3.14)$

r = radius h = height or length

$$r = \frac{8 \text{ ft } 9 \text{ in}}{2} = \frac{8.75 \text{ ft}}{2} = 4.375 \text{ ft}$$

h = 15.5 ft

$\text{Volume} = (3.14)(4.375 \text{ ft})^2 (15.5 \text{ ft})$

= 931.57 cu ft

= 932 cu ft to the nearest cubic foot

Total gallons = (932 ~~cu ft~~)(7.5 gal/~~cu ft~~)

= 6,990 gallons

Difference = 6,990 gals - 5,000 gals = 1,990 gals

The new tank holds 1,990 gallons more than the old tank.

7. Sales price = (66.75 ft)(150 ft)($0.16/sq ft)

= (10,012.5 ~~sq ft~~)($0.16/~~sq ft~~)

= $1,602

Commission = ($1,602)(0.06) = $96.12

Complete Solutions to B Problems (continued)

8. Total acreage = $\frac{\text{square footage}}{43{,}560 \text{ sq ft/acre}}$

$= \frac{(264 \text{ ft})(660 \text{ ft})}{43{,}560 \text{ sq ft/acre}}$

$= \frac{174{,}240 \text{ sq ft}}{43{,}560 \text{ sq ft/acre}}$

= 4 acres

Total cost = (4 acres)($800/acre) = $3,200

9. (a) Total feet = (5,280 ft/mi)(1.18 mi)

= 6,230 ft (nearest foot)

(b) Total cost = (square footage)($2.25/sq ft)

= (6,230 ft)(40 ft)($2.25/sq ft)

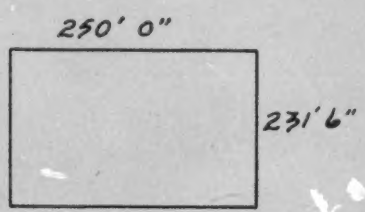
= (249,200 sq ft)($2.25/sq ft)

= $560,700

10. (a) Get the perimeter of the site in feet, then convert to rods:

Perimeter = (2 sides)(250 ft/side) + (2 sides)(231.5 ft/side)

= 500 ft + 463 ft = 963 ft




963 ft = $\frac{963 \text{ ft}}{16.5 \text{ ft/rod}}$ = 58.4 rods

59 rods of fencing are required

(b) Cost = (59 rods)($2.25/rod) = $132.75

11. (a) 1 cubic yard = (3 ft)(3 ft)(3 ft) = 27 cu ft

So, find total cubic feet and convert to cubic yards

Cubic feet = (960 ft)(40 ft)(0.5 ft)

= 19,200 cu ft

Complete Solutions to B Problems (continued)

11. (continued)

$$\text{Concrete} = \frac{19{,}200 \text{ cu ft}}{27 \text{ cu ft/cu yd}} = 711.1 \text{ cu yd}$$

(b) Need to order a full cubic yard in order to get the 0.1 cubic yard.

Cost = (712 cu yds)($15.50/cu yd)

= $11,036.00

12. Total square footage = (6.5 acres)(43,560 sq ft/acre)

= 283,140 sq ft

Original cost = (283,140 sq ft)($0.35/sq ft) = $99,099

The club must sell 99,099 sq ft at $1.00 per sq ft in order to recover their investment.

$$\text{Property that must be sold} = \frac{99{,}099 \text{ sq ft}}{43{,}560 \text{ sq ft/acre}} = 2.275 \text{ acres}$$

13. Area of parcel = (1/2)(base)(height)

= (0.5)(100 ft)(40 ft) = 2,000 sq ft

Selling price = (2,000 sq ft)($0.12/sq ft) = $240.00

14. $$\text{Tax rate on 213' by 250' lot} = \frac{\$51.31}{(213 \text{ ft})(250 \text{ ft})} = \frac{\$51.31}{53{,}250 \text{ sq ft}}$$

Thus, on the 17' by 250' strip:

Total tax = (tax rate)(square footage)

$$= \left(\frac{\$51.31}{53{,}250 \text{ sq ft}}\right)(17 \text{ ft})(250 \text{ ft})$$

$$= \frac{(\$51.31)(4{,}250 \text{ sq ft})}{53{,}250 \text{ sq ft}} = \frac{\$218{,}067.50}{53{,}250}$$

= $4.10 (use a calculator and don't round the intermediate results.)

Complete Solutions to B Problems (continued)

15. Total weight = weight of fish + weight of cans + weight of boxes

$$= (12 \text{ oz/can})(12 \text{ cans/doz})(64 \text{ doz}) +$$

$$(1 \text{ oz/can})(12 \text{ cans/doz})(64 \text{ doz}) + (8 \text{ oz/box})\left(\frac{64 \text{ doz}}{2 \text{ doz/box}}\right)$$

$$= 9{,}216 \text{ oz} + 768 \text{ oz} + 256 \text{ oz}$$

$$= 10{,}240 \text{ oz}$$

$$10{,}240 \text{ oz} = \frac{10{,}240 \text{ oz}}{16 \text{ oz/lb}} = 640 \text{ lbs}$$

Total weight = 640 pounds

A. Problems with Solutions

1. Mr. Goodman invests part of $7,500 at 3% annual interest and the rest at 5% annual interest. The income from the two investments is $279 annually. How much did Mr. Goodman invest at each rate?

Solution:

List the quantities you will use:

Amount invested at 3% = x dollars
Amount invested at 5% = 7,500 - x dollars
Income from the 3% investment = 0.03x dollars
Income from the 5% investment = 0.05(7,500 - x) dollars
Income from both investments = $279

$0.03x + (0.05)(\$7,500 - x) = \$279$

$0.03x + \$375 - 0.05x = \$279$

$0.03x - 0.05x = \$279 - \$375$

$-0.02x = -\$96$

$$x = \frac{-\$96.00}{-0.02} = \$4,800$$

Amount invested at 5% = $7,500 - $4,800 = $2,700

Amount invested at 3% = $4,800

2. Mike and Bob are partners. The agreement is that Mike's profit is to be 25% greater than that of Bob. The profit to be divided for this year is $52,000. How much did each partner receive?

Solution:

x = amount Bob receives

x + 0.25x = amount Mike receives

$x + x + 0.25x = \$52,000$

$2.25x = \$52,000$

$$x = \frac{\$52,000}{2.25} = \$23,111.11$$

$x + 0.25x = \$23,111.11 + \$5,777.78$
$= \$28,888.89$

Mike receives $28,888.89
Bob receives $5,777.78

A. Problems with Solutions (continued)

3. A suit cost $65. What must the suit be sold for if a profit of 20% of the selling price is to be made?

Solution:

Profit = (0.20)(selling price)

Selling price = cost + profit

SP = Selling price

P = profit

SP = $65.00 + P  P = (0.20)SP

SP = $65.00 + (0.20)SP

(0.80)SP = $65.00

$$SP = \frac{\$65.00}{0.80} = \$81.25$$

4. How much will Tina, Shelley and Connie each receive if $180 is to be divided so that Shelley receives 2/3 as much as Tina, and Connie receives 1/2 as much as Shelley?

Solution:

x = amount that Tina receives

(2/3)x = amount that Shelley receives

1/2(2/3)x = amount that Connie receives

x + (2/3)x + 1/2(2/3)x = $180

x + 2/3x + 1/3x = $180

2x = $180

x = $90

2/3x = (2/3)($90) = $60

1/2(2/3)x = (1/2)($60) = $30

Tina receives $90, Shelley receives $60 and Connie receives $30.

B. Problems without Solutions

5. An automobile costs a dealer $1,300. What must his selling price be to give him 20% of the selling price as overhead and 15% of the selling price for profit?

6. When an article costs $6, what should the minumum selling price be so that the profit will be at least 20% of the selling price?

7. One card sorter can process a deck of punched cards in 30 minutes while another can sort the deck in 45 minutes. How long would it take the two sorters together to process the cards?

B. Problems without Solutions (continued)

8. In a factory, one worker can complete a job with a punch press in 7 days, but it takes another worker 8 days to complete the same job with the same kind of machine. If both machines are operating at the same time, how long will it take to do this job?

9. A grocer mixed nuts selling at 40¢ a pound with some selling for 60¢ a pound. If he got 200 lb which he could sell for 48¢ a pound, how many pounds of the 60¢ nuts did he use?

10. A discount store owner pays $15 for a transistor radio on which he wishes to make a 30% profit based on the selling price after he has allowed a discount of 10% to his customer. What should he set as the list price of the radio?

Complete Solutions to B Problems

5. SP = Selling Price

Overhead = (0.20)SP

Profit = (0.15)SP

SP = Cost + Profit + Overhead

SP = \$1,300 + (0.15)SP + (0.20)SP

SP - (0.15)SP - (0.20)SP = \$1,300

(0.65)SP = \$1,300

$SP = \frac{\$1,300}{0.65} = \$2,000$

6. SP = Selling Price
Profit = (0.20)SP

SP = cost + profit

SP = \$6.00 + (0.20)SP

SP - (0.20)SP = \$6.00

(0.80)SP = \$6.00

$SP = \frac{\$6.00}{0.80} = \$7.50$

7. Let x = minutes required with both sorters working
Then $\frac{1}{x}$ = part of the job that can be done in one minute when sorters are sorting.

To help see this, note that:

Whole job = (minutes worked)(part of job per minute)

$= (x)\left(\frac{1}{x}\right)$

$= 1$

$\frac{1}{45}$ = part of job 45 min sorter does in 1 minute.

$\frac{1}{30}$ = part of job 30 min sorter does in 1 minute

Complete Solutions to B Problems (continued)

7. (continued)

$\frac{1}{45} + \frac{1}{30}$ = part of job both can do in 1 minute

Thus, $\frac{1}{45} + \frac{1}{30} = \frac{1}{x}$

Multiply both sides by (30)(45)(x):

$$(30)(45)\left[\frac{1}{45} + \frac{1}{30}\right] = \left(\frac{1}{x}\right)(30)(45)(x)$$

$30x + 45x = 1{,}350$

$75x = 1{,}350$

$x = \frac{1{,}350}{75} = 18$ min

8. (Very similar to problem 7.)

Let x = time required with both machines running

then $\frac{1}{7} + \frac{1}{8} = \frac{1}{x}$ (see discussion in problem 7)

multiply by (7)(8)(x):

$$(7)(8)(x)\left[\frac{1}{7} + \frac{1}{8}\right] = \frac{1}{x}\ (7)(8)(x)$$

$8x + 7x = 56$

$15x = 56$

$x = \frac{56}{15} = 3\ 11/15$ days

9. x = pounds of 60¢ nuts
200 - x = pounds of 40¢ nuts

($0.60)x = income from selling x lbs at 60¢ a pound
($0.40)(200-x) = income from selling 200 - x lbs at 40¢ a pound
($0.48)(200) = income from selling 200 lbs at 48¢ a pound

Complete Solutions to B Problems (continued)

9. (continued)

The income from the sale of the 48¢ mixture must equal the combined income from the sale of the 50¢ and 40¢ nuts.

$(\$0.40/\text{lb})(200\ \text{lbs} - x) + (\$0.60/\text{lb})(x) = (\$0.48/\text{lb})(200\ \text{lbs})$

$\$80.00 - (\$0.40/\text{lb})x + (\$0.60/\text{lb})x = \$96.00$

$(\$0.20/\text{lb})x = \$96.00 - \$80.00$

$(\$.20/\text{lb})x = \$16.00$

$$x = \frac{\$16.00}{\$0.20/\text{lb}} = \$80\ \text{lbs}$$

10. List Price = LP
Selling Price = SP

$LP = SP + \text{Discount}$

$\text{Discount} = (0.10)LP$

$SP = \text{cost} + \text{profit}$

$\text{Profit} = (0.30)SP$

$SP = \$15.00 + (0.30)SP$

$(0.70)SP = \$15.00$

$$SP = \frac{\$15.00}{0.70} = \$21.43$$

$LP = \$21.43 + (0.10)LP$

$(0.90)LP = \$21.43$

$$LP = \frac{\$21.43}{0.90} = \$23.81$$

A. Problems with Solutions

1. A teller mistakenly reversed the two digits in the face amount of a check, overpaying $9. If the sum of the digits was 9, determine the amount for which the check was drawn. (Assume the check amount was between $10 and $99.)

Solution:

Let x = first digit in correct number
y = second digit in correct number

Then, $10x + y$ = correct check amount

$10y + x$ = incorrect check amount

Since the teller overpayed $9

$10x + y + 9 = 10y + x$

$10x - x + y - 10y = -9$

$9x - 9y = -9$

$x - y = -1$

$x = y - 1$

It was given that $x + y = 9$

So, $\left.\begin{array}{l} x - y = -1 \\ x + y = 9 \end{array}\right\}$ are the two equations

Since $x = y - 1$ + $x + y = 9$

$(y-1) + y = 9$

$2y - 1 = 9$

$2y = 10$
$y = 5$
$x = 4$

Correct check amount = $45

A. Problems with Solutions (continued)

2. A grocer blends teas worth 66¢ and 48¢ a pound. If he interchanges the amounts, he saves $6 in a blend of 100 pounds. Find the ratio of the weight of the two teas in the original blend.

Solution:

Let x = lbs of 66¢ tea in original blend
y = lbs of 48¢ tea in original blend

Then 66x + 48y = cost in cents of original blend

66y + 48x = cost in cents of original blend

Since the total weight was 100 lbs

$x + y = 100$
$x = 100 - y$

Since the new blend saves 600¢ on the original

$66x + 48y = 66y + 48x + 600$

$66(100-y) + 48y = 66y + 48(100-y) + 600$

$6600 - 66y + 48y = 66y + 4800 - 48y + 600$

$6600 - 18y = 18y + 5400$

$6600 = 36y + 5400$

$1200 = 36y$

$33\ 1/3 = y$

From above
$x + 33\ 1/3 = 100$

$x = 66\ 2/3$

Ratio of 66¢ to 48¢ teas = $\frac{66\ 2/3}{33\ 1/3} = 2/1$ or 2 to 1

A. Problems with Solutions (continued)

3. In two years, a sum of money at simple interest amounted to $330 while in five years it amounted to $375. What was the sum, and what was the interest rate?

Solution:

Let P = the original sum (principal)

R = interest rate

Note: A basic formula used in this situation is I = P R T

where I = interest earned in T years on the principal (P)

Therefore, we have:

$330 = P R 2 + P

$375 = P R 5 + P

or factoring:

$330 = P(2R+1)

$375 = P(5R+1)

From the first equation $P = \frac{\$330}{2R+1}$

Substituting in the second equation

$\$375 = \frac{\$330}{2R+1}(5R+1)$

$\$375(2R+1) = \$330(5R+1)$

$750R + 375 = 1650R + 330$

$375 = 900R + 330$

$45 = 900R$

$\frac{45}{900} = R$

$.05 = R$

From above $P = \frac{\$330}{2(.05)+1}$

$P = \frac{\$330}{1.1}$

$P = \$300$

B. Problems without Solutions

4. Working together, two sorters can process 1,200 cards in one minute. The faster sorter breaks down after operating 1/2 minute, and the time to process 1,200 cards is increased to 2 minutes. How many cards can each sorter handle in one minute?

5. Payless makes a profit of 2¢ on each bottle of brand X aspirin that it sells, and a profit of 6¢ on each bottle of brand Y aspirin that it sells. How many bottles of each brand must the druggist sell if he is to make a total profit of $8 from the sales of these two brands of aspirin?

6. Refer to problem 5 and decide how many bottles of each brand the druggist must sell if the total number of bottles sold is 280.

B. Problems without Solutions (continued)

7. The butcher is to buy some chickens and ducks. He will sell the chickens at a profit of 2¢ per lb and will lose 1¢ per lb on the ducks. He does not wish to make a profit since these items will be used to attract customers. Nor does he intend to lose money on the sales. The suppliers will sell to him at attractive prices only if he buys the same number of pounds of ducks as of chickens. How many pounds of each should the butcher buy in order to meet these conditions.

8. The same butcher decides to make a profit of $20 on the sale of chickens and ducks. The market has changed, and now he must buy 100 lbs more of ducks than of chickens. How many pounds of each should he buy?

B. Problems without Solutions (continued)

9. Suppose that the butcher now makes 2¢ per lb on chickens and loses 1¢ per lb on ducks. He wishes to make $10 for handling costs. The supplier now requires that he buy in such a way that the pounds of chickens purchased exceed by 500 lbs one-half the number of pounds of ducks.

   (a) How many pounds of ducks should he buy?

   (b) Chickens?

   (c) If he buys 300 lbs of chickens, can he achieve his goal of $10?

   (d) If he buys 150 lbs of ducks, can he achieve his goal?

B. Problems without Solutions (continued)

10. A mail-order firm uses the following equation to estimate the number of dollars to sales for the day from the weight of first-class mail received by 7:00 a.m.

Sales = A + B(x) where x is the weight of the mail.

If the number of shipping clerks needed is one per $12,000 of sales, find the number of clerks needed on a day when the mail weighs 300 lbs given

$$11A + 115B = 49,620$$
$$115A + 1,595B = 683,700$$

Complete Solutions to B Problems

4. Let x = number of cards slow sorter can handle in one minute
y = number of cards fast sorter can handle in one minute

Two equations are:

$x + y = 1,200$
$2x + 1/2y = 1,200$

From first equation
$x = 1,200 - y$

Substituting into second equation
$2(1,200 - y) + 1/2y = 1,200$

$2,400 - 2y + 1/2y = 1,200$

$2,400 - 1\ 1/2y = 1,200$

$1,200 = 1\ 1/2y$

$800 = y$ cards per minute

Since $x + y = 1,200$

$x = 400$ cards per minute

5. Let x = number of bottles of brand x
y = number of bottles of brand y

.02x = profit from sale of brand x
.06y = profit from sale of brand y

The only equation obtained from this information is:

$.02x + .06y = 8$

Therefore, any x and y values satisfying this equation would be valid.

6. Using the same definitions as in solution 5, the two equations used are:

$x + y = 280$
$.02x + .06y = 8$

From equations 1, $x = 280 - y$
So, $.02(280 - y) + .06y = 8$
$5.6 - .02y + .06y = 8$
$5.6 + .04y = 8$
$.04y = 2.40$

$y = 60$ bottles
so $x = 220$ bottles

Complete Solutions to B Problems (continued)

7. Let x = lbs of chickens
y = lbs of ducks

.02x = profit on a chicken
-.01y = profit on a duck (a loss)

The two equations are

$$.02x - .01y = 0$$
$$x - y = 0$$

Since x = y

$$.02x - .01x = 0$$

$$.01x = 0$$

$$x = 0$$

$$y = 0$$

8. Refer to problem 7

The two equations are now:

$$.02x - .01y = 20$$
$$x + 100 = y$$

So, $.02x - .01(x + 100) = 20$

$$.02x - .01x - 1 = 20$$

$$.01x = 21$$

x = 2,100 lbs of chicken
y = 2,200 lbs of duck

9. Refer to problem 7

The two equations are now:

$$.02x - .01y = 10$$
$$x - 500 = y/2$$

From equation #2: $2x - 1000 = y$

Complete Solutions to B Problems (continued)

9. (continued)

Substituting into equation 1:

$.02x - .01(2x - 1000) = 10$

$.02x - .02x + 10 = 10$

$10 = 10$

These are dependent equations. This means that x and y can be any numbers as long as they satisfy either of the equations:

$x - 500 = y/2$ or $.02x - .01y = 10$

(c) Set $x = 300$

This means

$300 = 500 + y/2$
$600 = 1000 + y$
$-400 = y$ Since y must be positive, this situation is impossible

(d) Set $y = 150$

Then $x = 500 + 150/2$
$x = 500 + 75$
$x = 575$ Therefore, he can achieve his goal

10. Solve the given system of equations for A + B

$11A + 115B = 49,620$
$115A + 1595B = 683,700$

From the first equation

$$A = \frac{49,620 - 115B}{11}$$ substituting in equation 2

$$115 \quad \frac{49,620 - 115B}{11} + 1,595B = 683,700$$

$115(4510.9 - 10.5B) + 1,595B = 683,700$
$392.7B = 164,946.5$
$B = 420$

Complete Solutions to B Probles (continued)

10. (continued)

$$A = \frac{49{,}620 - 115B}{11} = \frac{49{,}620 - 48{,}300}{11} = \frac{1{,}320}{11} = 120$$

Sales = A + B(x)

= 120 + 420(300)
= 120 + 126,000
= $126,120

$$\text{Number of clerks} = \frac{\text{total sales}}{\text{clerks/sale amount}}$$

$$= \frac{\$126{,}120}{\$12{,}000/\text{clerks}}$$

= 10.5 clerks

= 11 clerks

A. Problems with Solutions

1. Three partners, Able, Baker and Carter have shares in the partnership of 1: 2: 7 respectively. If there is a profit of $43,120, and it is to be distributed in proportion to share in the partnership, how much would each partner receive?

Solution:

There are 1 + 2 + 7 = 10 total shares in the partnership which is worth $43,120

Able has $\frac{1}{10} = \frac{x}{\$43,120}$ where x represents Able's share

Cross multiplying gives $10x = \$43,120$

$x = \$4,312$

Baker has $\frac{2}{10} = \frac{y}{\$43,120}$ where y represents Baker's share

Cross multiplying gives $10y = \$86,240$

$y = \$8,624$

Carter has $\frac{7}{10} = \frac{z}{\$43,120}$ where z represents Carter's share

Cross multiplying gives $10z = \$301,840$

$z = \$30,184$

2. Brown invests $4,400 and Black $5,200 in a partnership. If profits are to be shared in the ratio that each partner's investment bears to the total amount invested, what return should Black receive if Brown's share of the profits is $900?

Solution:

The ratio of the amounts should be the same as the ratio of profits. Let x = profit for Black. Then,

$$\frac{\$5,200}{\$4,400} = \frac{x}{\$900}$$

cross multiplying yields

$4,680,000 = \$4,400x$

$\$1,063.64 = x$

A. Problems with Solutions (continued)

3. A salted-nut mixture is made up of 3 pounds of cashews to 5 pounds of peanuts. How many pounds of each are needed to make 40 pounds of the mixture?

Solution:

Out of every 8 lbs of the mixture, 3 lbs are cashews. The remaining 5 lbs is peanuts.

The ratio of cashews to total weight then is 3/8, and the ratio of peanuts to total weight is 5/8. Since these ratios are constant, in 40 lbs of the mixture 3/8 or (3/8)(40) = 15 lbs would be cashews and 5/8 or (5/8)(40) = 25 lbs would be peanuts.

B. Problems without Solutions

4. A company had an earnings per share of stock of $2.25 when its stock was selling for $39/share. One month later the selling price had risen to $42 1/2 per share. Compute the price/earnings ratios before and after the rise in price, assuming the earnings remain constant.

5. Cummings Company employs 48 factory workers. Four operations are performed. Compute the number of workers assigned to each operation.

| | Proportion of Total Work Performed | No. of Workers Assigned to Operation |
|---|---|---|
| Cutting | 1/4 | |
| Fitting | 1/3 | |
| Bolting | 3/8 | |
| Finishing | 1/24 | |
| | 1 | 48 |

B. Problems without Solutions (continued)

6. A and B are partners. How much does each receive if a profit of $13,000 is divided in a ratio of 7 to 3 in favor of A?

7. Current ratio is defined as the ratio of a firm's current assets to current liabilities. Compute the current ratio for Kleg Corp. which has current assets of $126,000 and current liabilities of $91,500 (to nearest thousandth).

8. Dept B employees earned a yearly bonus of $3,600. This amount will be distributed to the three employees in proportion to their annual salaries. Calculate each man's share.

| Employee | Salary | Bonus |
|---|---|---|
| Jones | $6,000 | |
| Smith | $8,000 | |
| Wilson | $10,000 | |
| | | $3,600 |

B. Problems without Solutions (continued)

9. Mr. Johnson invested $39,600 in an apartment house earning a profit of $4,250 yearly. He invests $26,400 in anotner apartment house, expecting to earn a profit 1/3 larger in ratio to the amount invested. How much yearly profit does Mr. Johnson expect on the $26,400 apartment hourse?

10. The ratio of net income to net worth (stockholder's equity) indicates the percent of return on invested capital. Compute the rate of return on equity for a firm with $4,000 net income and $29,000 stockholder's equity.

11. A gain of $32,550 is to be divided between 3 partners in the ratios of 1/6, 1/3 and 1/2. How should the profit be divided?

12. Two business partners divide their profits in a 1 to 4 ratio. Find each partner's share of a profit amounting to $8,400.

B. Problems without Solutions (continued)

13. A building assessed at $15,000 is billed $475.50 for property taxes. A similar building next door, assessed at $21,000, should be billed how much for taxes?

14. The ratio of a firm's net income to net sales gives a measure of the firm's percent of profit on sales. Compute the ratio for a firm with net income of $4,000 and net sales of $90,000.

Complete Solutions to B Problems

4. $\frac{\text{Price}}{\text{Earnings}}$ Before $= \frac{\$39}{\$2.25} = 17.33$

After $= \frac{\$42.50}{\$2.25} = 18.89$

5. Cutting $= (1/4)(48) = 12$

Fitting $= (1/3)(48) = 16$

Bolting $= (3/8)(48) = 18$

Finishing $= (1/24)(48) = 2$

6. Total number of fractions $= 7 + 3 = 10$

A receives 7/10 and B receives 3/10

$(7/10)(\$13,000) = \$9,100 =$ A's share

$(3/10)(\$13,000) = \$3,900 =$ B's share

7. $\frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{\$126,000}{\$91,500} = 1.377$

8. Total salary $= \$6,000 + \$8,000 + \$10,000 = \$24,000$

Jones will receive $\left(\frac{\$6,000}{\$24,000}\right)(\$3,600) = \$900$

Smith will receive $\left(\frac{\$8,000}{\$24,000}\right)(\$3,600) = \$1,200$

Wilson will receive $\left(\frac{\$10,000}{\$24,000}\right)(\$3,600) = \$1,500$

9. Ratio of profit to amount invested in first apartment $= \frac{\$4,250}{\$39,600}$

Complete Solutions to B Problems (continued)

9. (continued)

$$\text{For a 1/3 increase} = \left(\frac{\$4,250}{\$39,600}\right)(4/3)(\text{amount invested in second apartment})$$

$$= \left(\frac{\$4,250}{\$39,600}\right)(4/3)(\$26,400) = \$3,777.78$$

10. $\frac{\text{Net income}}{\text{Net worth}} = \left(\frac{\$4,000}{\$29,000}\right)(100) = \%\text{ return}$

$= 13.79\%$

11. $(1/6)(\$32,550) = \$5,425$

$(1/3)(\$32,550) = \$10,850$

$(1/2)(\$32,550) = \$16,275$

12. Total number of shares = 1 + 4 = 5

Amount to one partner = $(1/5)(\$8,400) = \$1,680$

Amount to other " = $(4/5)(\$8,400) = \$6,720$

13. The ratio of property takes to assessed value should be constant:

$\frac{\$475.50}{\$15,000} = \frac{x}{\$21,000}$ where x = amount to be taxed on next building

$15,000x = \$9,985,500$

$x = \frac{\$9,985,500}{15,000}$

$x = \$665.70$

14. Percent profit on sales = $\frac{\text{net income}}{\text{net sales}} = \frac{\$4,000}{\$90,000}(100) = 4.44\%$

SEE CLERICAL FOR GRAPH PROBLEMS

A. Problems with Solutions

1. A fund contains $782.16. If it earns interest at 3% compounded semiannually (m = 2), how much will be in the fund at the end of 15 1/2 years?

Solution:

Accumulated sum = (principal)(1 + periodic interest) raised to a power equal to the number of periodic intervals, or $S = P(1 + i)^n$. m will be used to indicate the number of times interest is computed per year. So,

$$S = P\left(1 + \frac{i}{m}\right)^{(n)(m)}$$

In this problem, P = 782.16

$$\frac{i}{m} = \frac{.03}{2} = .015$$

$$n = (15.5)(2) = 31$$

So, $S = 782.16(1.015)^{31}$

Using logarithms:

log S = log 782.16 + 31 log 1.015

log S = 2.89330 + .20045

log S = 3.09375

So, S = $1,240.94

Note: Your answer may differ from this by a few cents if you used tables instead of a calculator.

2. Accumulate $3246.70 for 14 3/4 years at (.05, m = 4)

Solution:

As in problem 1, $S = P\left(1 + \frac{i}{m}\right)^{(n)(m)}$

P = $3,246.70

$$\frac{i}{m} = \frac{.05}{4} = .0125$$

nm = (14.75)(4) = 59

A. Problems with Solutions (continued)

2. (continued)

So, $S = \$3,246.70\ (1 + .0125)^{59}$

$\log S = \log 3,246.70 + 59 \log 1.0125$

$\log S = 3,51144 + 59\ (.00548)$

$\log S = 3.51144 + .31831$

$\log S = 3.82975$

$S = \$6,756.92$

3. If money is worth(.04, m = 2), find the present value today of $5693.60 which is due in 8 1/2 years.

Solution:

$$S = P\left(1 + \frac{i}{m}\right)^{(n)(m)}$$

$S = \$5693.60$

$P = ?$

$\frac{i}{m} = \frac{.04}{2} = .02$

$nm = (8.5)2 = 17$

$\$5693.60 = P\ (1 + .02)^{17}$

$\log 5693.60 = \log P + 17 \log(1 + .02)$

$3.75539 = \log P + (17)(.00860)$

$3.75539 = \log P + .14620$

$3.60918 = \log P$

$\$4,066.16 = P$

B. Problems without Solutions

4. At what rate, compounded quarterly, will $2475 accumulate to $6394.95 in 22 1/2 years?

5. When must a payment of $3500 be made to extinguish a debt of $3000 which bears interest at (.04, m = 4).

B. Problems without Solutions (continued)

6. Accumulate $439.26 for 7 1/2 years at 8 1/2% compounded semiannually.

7. If money is worth 6% compounded monthly (.06, m = 12), find the value today of $9643.80 which is due in 24 years.

8. After long litigation, a bill of $1743.20 was settled by a $3000 payment 15 years after the bill was incurred. What is the equivalent rate of interest compounded semiannually?

B. Problems without Solutions (continued)

9. At what nominal rate, compounded semiannually, will $600 accumulate to $1,150 in 14 years?

10. Maier borrows $8,250 from Boyll which he promises to repay in 7 years with accumulated interest at 4%. Five years from now, Boyll sells the note to a bank which charges (.05, m = 2). What rate has Boyll actually earned during those 5 years?

Complete Solutions to B Problems

4. $S = P\left(1 + \frac{i}{m}\right)^{nm}$ $S = \$6,394.95$

$P = \$2,475$

$\frac{i}{m} = ?$

$m = 4$

$mn = (22.5)(4) = 90$

$\$6,394.95 = \$2,475\left(1 + \frac{i}{m}\right)^{90}$

$\log 6,394.95 = \log 2,475 + 90 \log\left(1 + \frac{i}{m}\right)$

$3.80584 = 3.39358 + 90 \log\left(1 + \frac{i}{m}\right)$

$.41226 = 90 \log\left(1 + \frac{i}{m}\right)$

$.00458 = \log\left(1 + \frac{i}{m}\right)$

$1.01060 = 1 + \frac{i}{m}$

$.01060 = \frac{i}{m}$

$4(.01060) = i$

$.04241 = i$

$i = 4.24\%$

5. $S = P\left(1 + \frac{i}{m}\right)^{nm}$

$S = \$3,500 \quad P = \$3,000 \quad \frac{i}{m} = .01 \quad mn = 4(?)$

$\$3,500 = \$3,000\ (1 + .01)^{4n}$

$\log 3,500 = \log 3,000 + 4n \log (1 + .01)$

$3.54407 = 3.47712 + 4n\ (.00432)$

Complete Solutions to B Problems (continued)

5. (continued)

$3.54407 - 3.47712 = 4n\ (.00432)$

$.06695 = 4n\ (.00432)$

$.06695 = n\ (.01729)$

$\frac{.06695}{.01729} = n$

$3.87 \text{ yrs} = n$

6. $S = P\left(1 + \frac{i}{m}\right)^{nm}$

$S = ?\quad P = \$439.26$

$\frac{i}{m} = \frac{.085}{2} = .0425$

$mn = (2)(7.5) = 15$

$S = \$439.26\ (1 + .0425)^{15}$

$\text{Log } S = \log 439.26 + 15 \log\ (1 + .0425)$

$\text{Log } S = \log 439.26 + 15 \log 1.0425$

$\text{Log } S = 2.64272 + 15\ (.01808)$

$\text{Log } S = 2.64272 + .27114$

$\text{Log } S = 2.91386$

$S = \$820.09$

7. $S = P\left(1 + \frac{i}{m}\right)^{nm}$

$S = \$9,643.80 \quad P = ? \quad \frac{i}{m} = \frac{.06}{12} = .005 \quad mn = (12)(24) = 288$

$\$9,643.80 = P\ (1 + .005)^{288}$

Complete Solutions to B Problems (continued)

7. (continued)

$\log 9{,}643.80 = \log P + 288 \log(1 + .005)$

$\log 9{,}643.80 = \log P + 288 \log(1.005)$

$3.98425 = \log P + 288(.00217)$

$3.98425 = \log P + .62383$

$3.98425 - .62383 = \log P$

$3.36042 = \log P$

$\$2{,}293.11 = P$

8. $S = P\left(1 + \frac{i}{m}\right)^{nm}$

$S = \$3{,}000 \quad P = \$1{,}743.20 \quad \frac{i}{m} = ? \quad m = 2 \quad nm = (2)(15) = 30$

$\$3{,}000 = \$1{,}743.20\left(1 + \frac{i}{2}\right)^{30}$

$\log 3{,}000 = \log 1{,}743.20 + 30 \log\left(1 + \frac{i}{2}\right)$

$3.47712 = 3.24135 + 30 \log\left(1 + \frac{i}{2}\right)$

$.23577 = 30 \log\left(1 + \frac{i}{2}\right)$

$.00785 = \log\left(1 + \frac{i}{2}\right)$

$1.01826 = 1 + \frac{i}{2}$

$.01826 = \frac{i}{2}$

$.03652 = i \qquad .0365 = 3.65\%$

Complete Solutions to B Problems (continued)

9. $S = P\left(1 + \frac{i}{m}\right)^{nm}$

$S = \$1,150 \quad P = \$600 \quad \frac{i}{m} = ? \quad mn = (2)(14) = 28$

$\$1,150 = \$600\left(1 + \frac{i}{2}\right)^{28}$

$\log 1,150 = \log 600 + 29 \log\left(1 + \frac{i}{2}\right)$

$3.06070 = 2.77815 + 28 \log\left(1 + \frac{i}{2}\right)$

$.28255 = 28 \log\left(1 + \frac{i}{2}\right)$

$.01009 = \log\left(1 + \frac{i}{2}\right)$

$1.02351 = 1 + \frac{i}{2}$

$.02351 = \frac{i}{2}$

$.04702 = i \qquad .04702 = 4.70\%$

10. Another way to write the formula $S = P(1 + i)^n$ is $P = S(1 + i)^{-n}$. $(1 + i)^{-n}$ is referred to as the discount factor and $(1 + i)^n$ as the accumulation factor. When we want the present value of an amount of money, we just multiply it by $(1 + i)^{-n}$.

In this problem, the maturity value of the note is $\$8,250(1.04)^{-1}$. Of course, the bank does not pay that much to Boyll for the note, but must "discount" the note for the two years till maturity. Let x = dollars bank pays Boyll. Then $x = [8250(1.04)^7] \times [(.025)^{-4}]$. To find the interest rate Boyll earns, we need to find the rate necessary to accumulate \$8,250 to x dollars in 5 years.

Thus, $8,250(1 + i)^5 = 8,250(1.04)^7 (1.025)^{-4}$
Before taking logs, divide both sides by 8,250. Then,

$5 \log(1 + i) = 7 \log(1.04) - 4 \log(1.025)$

$= 7(.017033) - 4(.010724)$

$= .0763379$

Complete Solutions to B Problems (continued)

10. (continued)

So, $\log(1 + i) = .01527$

$1 + i = 1.0358$

$i = 3.58\%$

This one may give you a little difficulty, so study it carefully and slowly.

A. Problems with Solutions

1. A merchant received $60 for a machine that cost him $24. If the selling expense amounted to 25 percent of the cost price, the profit was what percent of the selling price?

Solution:

The selling expense is the money it costs the businessman to handle the machine. The cost price is what he paid for the machine.

Selling expense = ($24.00)(25%) = ($24.00)(0.25) = $6.00

Profit = Selling price - cost - selling expense

Profit = $60.00 - ($24.00 + $6.00)

= $60.00 - $30.00 = $30.00

Percent of selling price = $\frac{\$30}{\$60}$ = 0.50 = 50%

2. If an article that costs $16 is sold for $24.50, the profit is what (a) percent of the cost, (b) what percent of the selling price?

Solution:

Profit = selling price - cost

Profit = $24.50 - $16.00 = $8.50

(a) Profit as percent of cost = $\frac{\$8.50}{\$16.00}$ = 0.53 = 53%

(b) Profit as percent of selling price = $\frac{\$8.50}{\$24.50}$ = 0.35 = 35%

3. A realtor purchased a house for $16,400. After spending $560 on improvements, he sold it for 120% of the purchase price. What was his profit?

Solution:

Total amount invested by realtor = $16,400 + $560 = $16,960

Sales price = ($16,400)(120%) = ($16,400)(1.20) = $19,680

Profit = $19,680 - $16,960 = $2,720

A. Problems with Solutions (continued)

4. The Fashion Shop reduced their fall coats in a post-holiday sale by 8 1/3% of the marked price. These coats originally sold for $65.00. What was the actual selling price?

Solution:

Amount of reduction = ($65.00)(8 1/3%)

= ($65.00)(0.08333) = $5.42

New selling price = $65.00 - $5.42 = $59.58

Note: (65)(0.0833) = 5.41
(65)(0.08333) = 5.42

Point: Use as many decimal digits in the decimal equivalent of a fractional percent as is needed to get the maximum dollar value.

B. Problems without Solutions

5. A grocer purchased 25 crates of berries for 70¢ each. If a crate was lost through spoilage, at what price per crate did he sell the remainder to gain at least a 35% profit?

6. A machine costing $800 will have a scrap value of 25% at the end of 8 years. Find the yearly depreciation charge by the straight-line method. (The straight-line method means it will depreciate the same amount each year.)

B. Problems without Solutions (continued)

7. A man who was thinking of buying a piece of property found the assessed value to be $3,000. If the average assessed value of property in the town was about 60 percent of the real value, about what was the property worth?

8. A merchant feels that, by an intensive campaign of advertising and service for 5 years, he can increase his sales each year 10 percent over the previous year's sales. If his sales were $130,000 for the year before the campaign started and the campaign was successful, how much would the sales be for the last year?

9. The monthly income from a building is $475.00. Yearly operating expenses amount to $1,867.00. If the owner receives a 10% annual return on his investment, how much did the building cost?

B. Problems without Solutions (continued)

10. Harold Hurst, an apple grower, shipped 670 boxes of apples to the Central State Produce Company, commission merchants, to be sold on a commission of 16 1/2%. The apples were sold at $3.50 a box. Insurance was 1/2% of gross sales. Transportation charges amounted to $92.05. Find the net proceeds.

11. Harland & Co. purchased the following produce for the Newton Grocers: 80 sacks of potatoes @ $4.25; 125 sacks of onions @ $3.25; 60 sacks of onions @ $2.00 (prices are per sack). Transportation charges amounted to $22.70. Insurance charges were 1/2% of the prime cost (cost of produce). Harland and Co. received a 14% commission based on the prime cost of the merchandise. How much did this transaction cost Newton Grocers?

12. A sports store has reduced the price of a boat on three different occasions in an effort to sell it. The original price was $805.70, and the three reductions were marked as 25%, 16 2/3% and 10% in that order. What is the final selling price?

B. Problems without Solutions (continued)

13. A machine was sold at a profit of $17.60 which was 16 percent of the cost. What was the selling price of the machine?

14. Sales decreased from $36,000 to $31,500 during a certain period of time. What rate of decrease did this represent (nearest tenth of 1%)?

15. A retail store manager bought a bill of goods at a cost of $950 less 25% and 5%. If it was sold for 12 1/2% more than the net cost, what was the selling price?

16. At what price should an article costing $5.20 be marked in order to allow a 2% discount for cash and make a profit of 25% of cost?

B. Problems without Solutions (continued)

17. Zane Brothers purchased a selection of Floor lamps at a net price of $875 which were listed by the wholesaler at $1,250. What was the rate of discount?

18. A suit which costs $66.50 sells for $95.00. What is the percent markup based on (a) cost, (b) selling price?

19. Mrs. Romine bought 20 suits at $30.00 each. She sold 12 at $47.50 each; 3 were soiled and sold for $35.00 each. At what price must she sell the remainder to make a gross profit of 40% on total cost?

20. A gas stove sells for $260. If operating expenses are 30% of sales and net profit is 8% of sales, what is the cost of the stove?

Complete Solutions to B Problems

5. Total cost = (25 crates)($0.70/crate) = $17.50

Number of good crates = 25 crates - 1 crate = 24 crates

Profit he wishes to make = ($17.50)(35%) = ($17.50)(0.35) = $6.13

Selling price to cover profit = $\frac{\$17.50 + \$6.13}{24 \text{ crates}}$

$= \frac{\$23.63}{24 \text{ crates}} = \$0.9846/\text{crates}$

Notice that if he sells the crates for $0.98 each, his total income is (24 crates)($0.98/crates) = $23.52 which is $0.11 short of his goal! Since rounding off $0.9846 to $0.98 causes the grocer to be below his goal, he must round up to $0.99, thus making $0.13 over the desired profit level.

6. Total drop in value = ($800)(75%) = ($800)(0.75) = $600

Depreciation = $600/8 yr = $75/year

7. (Real value)(0.60) = $3,000

Real value = $\frac{\$3,000}{0.60} = \$5,000$

8. First year's sales = ($130,000)(1.10) = $143,000

Second year's sales = ($143,000)(1.10) = $157,300

Third year's sales = ($157,300)(1.10) = $173,030

Fourth year's sales = ($173,030)(1.10) = $190,333

Fifth year's sales = ($190,333)(1.10) = $209,366.30

9. Yearly income = ($475/month)(12 months/year) = $5,700/year

Annual return = $5,700 - $1,867 = $3,833

(Cost)(0.10) = $3,833

Cost = $\frac{\$3,833}{0.10} = \$38,330$

Complete Solutions to B Problems (continued)

10. Net Proceeds = gross sales - expenses

Gross sales = (670 boxes)($3.50/box) = $2,345.00

Expenses = commission charge + insurance + transportation

= (16 1/2%)(gross sales) + (1/2%)(gross sales) + $92.05

= (0.165)($2,345.00) + (0.005)($2,345.00) + $92.05

= $386.93 + $11.73 + $92.05

= $490.71

Net proceeds = $2,345.00 - $490.71 = $1,854.29

11. Grocer's cost = prime cost + (14%)(prime cost) + (1/2%)(prime cost) + transportation

Prime cost = (80 sacks)($4.25/sack) + (125 sacks)($3.25/sack) + (60 sacks)($2.00/sack)

= $340.00 + $406.25 + $120.00

= $866.25

Grocer's cost = $866.25 + (0.14)($866.25) + (0.005)($866.25) + $22.70

= $866.25 + $121.28 + $4.33 + $22.70

= $1,014.56

12. To get the final selling price, figure each percent reduction and subtract the reduction.

Selling price after:

First reduction $805.70 - ($805.70)(0.25) = $805.70 - $201.425
= $604.28

Second reduction $604.28 - ($604.28)(0.1666) = $604.28 - $100.71
= $503.57

Final reduction $503.57 - ($503.57)(0.10) = $503.57 - $50.357
= $453.21

Complete Solutions to B Problems (continued)

13. (cost)(16%) = $17.60

(cost)(0.16) = $17.60

$$\text{Cost} = \frac{\$17.60}{0.16} = \$110.00$$

Selling price = cost + profit

Selling price = $110.00 + $17.60 = $127.60

14. $$\text{Rate of decrease} = \frac{\$36{,}000 - \$31{,}500}{\$36{,}000} = \frac{\$4{,}500}{\$36{,}000} = 0.125 = 12.5\%$$

15. First find the net cost.

Cost after first discount = $850.00 - ($850.00)(0.25)

= $850.00 - $212.50 = $637.50

Net cost = $637.50 - ($637.50)(0.05)

= $637.50 - $31.875

= $605.63

Selling price = $605.63 + (0.125)($605.63)

= $605.63 + $75.70 = $681.33

16. When you discount the selling price by 2%, you are left with 98% of the selling price . So, (selling price)(98%) = cost + (cost)(25%)

(selling price)(0.98) = $5.20 + ($5.20)(0.25)

(selling price)(0.98) = $5.20 + $1.30

(selling price)(0.98) = $6.50

$$\text{Selling price} = \frac{\$6.50}{0.98} = \$6.63$$

Complete Solutions to B Problems (continued)

17. Amount of discount = $1,250 - $875 = $375

Rate of discount = $\frac{\$375}{\$1,250}$ = 0.30 = 30%

18. Total markup = selling price - cost

= $95.00 - $66.50

= $28.50

(a) Percent of cost = $\frac{\$28.50}{\$66.50}$ = 0.43 = 43%

(b) Percent of selling price = $\frac{\$28.50}{\$95.00}$ = 0.30 = 30%

19. Figure out the total cost, get 40% of this cost, then see how much is needed to meet this goal.

total cost = (20 suits)($30.00/suit) = $600.00

= ($600.00)(0.40)

= $240.00

Total selling price = cost + profit

= $600.00 + $240.00 = $840.00

Income so far = (12 suits)($47.50/suit) + (3 suits)($35.00/suit)

= $570.00 + $105.00 = $675.00

From the remaining suits, Mrs. Romine needs to receive:

$840.00 - $675.00 = $165.00

Sales price for remaining suits = $\frac{\$165.00}{5 \text{ suits}}$ = $33.00/suit

20. Cost = selling price - (profit + expenses)

Cost = $260.00 - [(0.08)($260.00) + (0.30)($260.00)]
= $260.00 - ($20.80 + $78.00)
= $260.00 - $98.80
= $161.20